

# RF Exposure Report

**Project Number:** 5028090**Offer Number:** SUW-202302004095**Report Number:** 5028090EMC15**Revision Level:** 0**Client:** UTEC, Inc.**Equipment Under Test:** Refrigerated Shipping Container Controller**Product Name:** Micro-Link 5 Controller**Model:** MICROLINK5B**FCC ID:** 2AK6N-MICROLINK5B**Applicable Standards:** 47 CFR §§ 2.1091

FCC KDB 447498 D01 General RF Exposure Guidance v06

FCC OET Bulletin 65

**Report issued on:** 30 May 2023**Result:** Compliant

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01

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## 1 General Information

### 1.1 Client Information

Company Name: UTEC, Inc.  
Address: 111 E. Wayne St., Suite 800  
City, State, Zip, Country: Fort Wayne, Indiana 46802, USA

### 1.2 Test Laboratory

Name: SGS North America, Inc.  
Address: 620 Old Peachtree Road NW, Suite 100  
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA  
Type of lab: Testing Laboratory  
Certificate Number: 3212.01

### 1.3 General Information of EUT

Equipment Under Test: Refrigerated Shipping Container Controller

Product Name: Micro-Link 5 Controller

Model: MICROLINK5B

Serial Numbers: 4120W008381

Frequency Ranges: 2402 – 2480 MHz (Bluetooth / BLE)  
2412 – 2462 MHz (WLAN)

Data Modes: Bluetooth Low Energy (BLE) – GFSK  
Bluetooth Classic – GFSK,  $\pi/4$ -DQPSK, 8DPSK  
WLAN IEEE 802.11b/g/n – DSSS, OFDM

Antennas: Two internal PCB trace antennas: (each with gain of 4.54dBi)\*

Max Conducted Output Power:  
BLE: 3.5 dBm  
Bluetooth Classic: 9.5 dBm  
WLAN 2.4GHz: 21.1 dBm

*\*Data was not measured by SGS laboratory and therefore SGS is not responsible for accuracy. Data obtained via customer, specification sheet, previous regulatory filing or other.*

### 1.4 Operating Modes and Conditions

Maximum power levels were utilized for all calculations. Simultaneous transmissions are possible between Bluetooth or BLE and WLAN 2.4GHz.

## 2 RF Exposure

### 2.1 Test Results

Test Description	Product Specific Standard	Test Result
RF Exposure	FCC Part 1.1310	Compliant

### 2.2 Test Method

The formula below calculates power density.

$$S = \frac{PG}{4\pi R^2} \quad S = \frac{EIRP}{4\pi R^2}$$

Or

where;

S = Power density (mW/cm<sup>2</sup>)

P = Maximum sourced based average power delivered to antenna port (mW)

G = Maximum numeric power gain of antenna relative to an isotropic radiator (dBi -> linear)

R = Distance between by-stander and antenna (cm)

EIRP = Equivalent (or effective) isotropically radiated power

The limits for general population / uncontrolled exposure were used at a distance of 20cm.

### 2.3 Single transmission RF Exposure Levels (mW/cm<sup>2</sup>)

Type	Band of Operation MHz	Conducted Power w/tolerance dBm	Antenna Gain	Cable Loss	Average EIRP		Distance (R) cm	Power Density EIRP <sub>Avg</sub> /(4πR <sup>2</sup> ) mW/cm <sup>2</sup>	FCC mW/cm <sup>2</sup>	% of Limit	Verdict
					dBm	mW					
WLAN 2.4	2400-2483.5	21.1	4.5	0.0	25.6	366	20	0.073	1.00	7%	Pass
Bluetooth	2400-2483.5	9.5	4.5	0.0	14.0	25	20	0.005	1.00	1%	Pass
Bluetooth LE	2400-2483.5	3.5	4.5	0.0	8.0	6	20	0.001	1.00	0%	Pass

### 2.4 Simultaneous Conditions

Simultaneous transmissions are evaluated using the equation and highest results from each technology.

$$\frac{S_1}{S_1 \text{ Limit}} + \frac{S_2}{S_2 \text{ Limit}} + \dots + \frac{S_n}{S_n \text{ Limit}} \leq 1.0$$

	WLAN 2.4	Bluetooth	Bluetooth LE
WLAN 2.4		8%	7%
Bluetooth	8%		
Bluetooth LE	7%		

Highlighted cells in the table above indicate worst case.

### 3 Revision History

Revision Level	Description of changes	Revision Date
0	Initial Release	30 May 2023